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Remarks:

FYI - This is a pretty good run-down on the Mohawk SLAR/IR Configuration -

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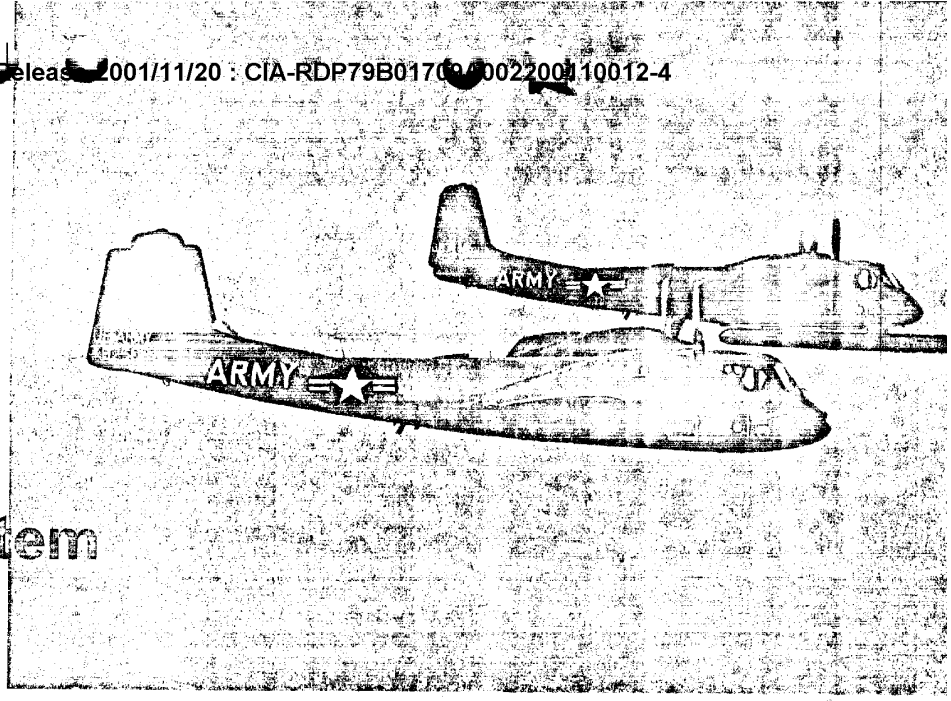
FORM NO. 237 Use previous editions (40)

U.S. GOVERNMENT PRINTING OFFICE : 1961 O—587282

The Mohawk Surveillance System



Two Grumman *Mohawks* of the types deployed in Vietnam. The aircraft in the background is the OV-1B, carrying the long, cigar-shaped antenna of the side-looking radar (SLAR) system. In the foreground is the OV-1C which carries an infra-red detection system.

he recent reports that the Grumman *Mohawk* as been deployed with the new 1st Cavalry ivision (Airmobile) in Vietnam, indicate at the US Army is now employing advanced connaissance systems in that theatre of erations. The furtive movements of the iet Cong; under cover of darkness and in nall groups, make the use of an effective telligence system essential if these fleeting rgets of opportunity are to be engaged with e minimum of delay.

The integrated *Mohawk* surveillance system, consisting of an aircraft, cameras, electronic sensory devices, and associated ground-based equipment, was developed by the US Army to give field commanders an effective system that could be immediately available to fulfil reconnaissance demands by the forward troops.

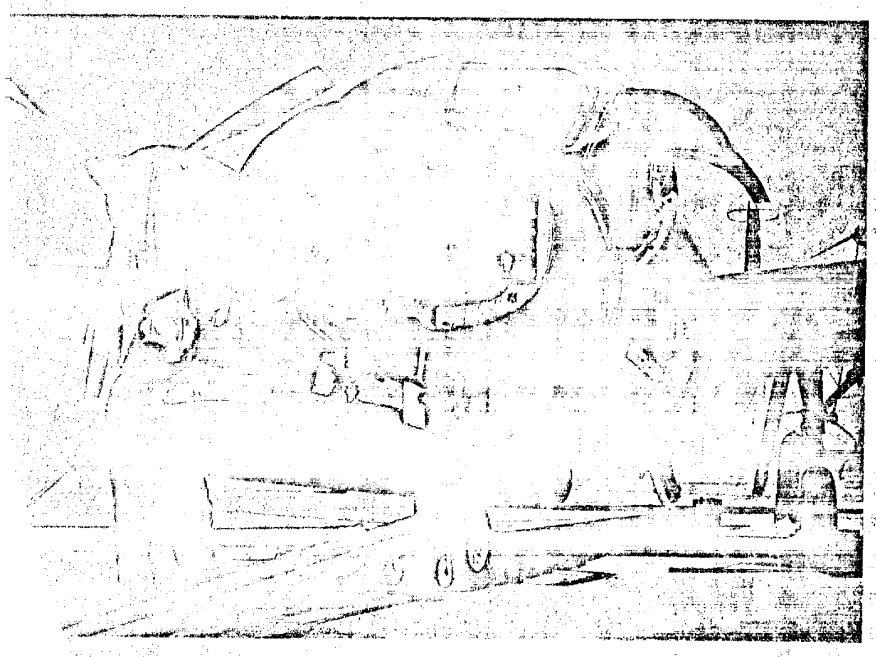
Three configurations of the *Mohawk* have been delivered to the US Army. The OV-1A is the basic visual aircraft; the OV-1B carries a long-range, side-looking radar (SLAR) system; and the OV-1C carries an infra-red detection system. All the aircraft have cameras capable of both day and night operation and some have been equipped with a new forward looking panoramic camera.

The AN/UPD-2 side-looking radar system of the *Mohawk* OV-1B is produced by Motorola's Military Electronics Division. It is a transistorized system consisting of the AN/APS-94 side-looking radar, the AN/AKT-18 data transmitting set, and the AN/ATQ-2 data receiving set on the ground. Rapid data processing is employed and displays are provided both in the aircraft and as a part of the AN/ATQ-2 receiving set. To simplify installation in the aircraft the radar and data transmitting systems are divided into two separate packages. The radar recorder is installed at the airborne observer's position, together with the operating controls and an oscilloscope to monitor the system operation; the operating controls being integrated into a semi-automatic system for ease of handling. Because of the simplicity of the system the radar observer need not be a skilled radar mechanic. This makes it possible to use an imagery interpreter observer to make on-the-spot interpretation of the processed image.

The radar picture is recorded on film and processed in the aircraft. Alternative recording units are available which use either 4 in. × 5 in. (10×12.7 cm.) cut film, 70 mm. roll film, and 5 in. (12,7 cm.) or 9½ in. (24 cm.) roll film. The film processor produces a developed negative in between 10 and 90 seconds.

The cathode ray tube indicator, integrated with the recorder viewer, is installed at the observer's position. A data transmission system, employing a flying spot scanner, records the persistent images from the cathode

ecking out the AN/APS-94 portion of the AN/UPD-2 side-looking radar surveillance system developed by otorola for the US Army. The AN/UPD-2 system consists of the AN/APS-94 airborne radar surveillance set ich obtains mapping imagery from the air; the AN/AKT 18 airborne radar data transfer set which transmits agery from the air to the ground; and the AN/ATQ2 receiving unit on the ground.



y tube. By using a scanning rate considerly slower than the radar sweep rate the dar picture is sufficiently compressed to rmit data transmission over voice communcation frequencies. On the ground, the TQ-2 data receiving set provides a display ntical to that in the aircraft.

The geometry of a side-looking radar is own in the accompanying diagram. The tenna pattern is a narrow fan-shaped beam, ss than 1° wide, extending sideways from e aircraft. In the *Mohawk* system the sideoking antennas are mounted back-to-back the pod beneath the fuselage and scan on ie or both sides of the aircraft flight path as quired. As the aircraft advances, this narw beam illuminates the ground from beath the aircraft outwards to the horizon, id the picture is built up by the beam anning successive strips of the terrain.

When used as a reconnaissance sensor, de-looking radar offers many distinct conasts to the conventional methods of photoaphic reconnaissance. One of the most utstanding is the coverage offered by a radar stem. As radar is a ranging device, its aximum range limit is approximately equal the line of sight distance to the horizon. onsequently, an aircraft flying at 3,000 ft. ove the ground is capable of recording pographical details up to a distance of 50 iles to each side of its flight path. It is not ncommon to map areas in excess of 30,000 quare miles during the course of a single run, id this record may be contained on a strip f film less than 2 ft. long.

The side-looking radar can, therefore, ful- two distinct functions. It can be used as a apping device to produce a picture of the ain topographical details over large areas f unknown or enemy-occupied terrain by day or night, or, by selecting the optimum combination of range and range delay, the largest possible image may be recorded for the detection of both fixed and moving targets on the ground.

This plan view illustrates the coverage obtained from the side-looking radar. The narrow fan-shaped beam projecting beyond the aircraft wing tip is the actual radar beam illuminating the ground, while the light area is the ground already scanned.

When side-looking radar is used for mapping, two types of distortion can arise in the finished strip map. The first of these is drift angle distortion caused by the aircraft encountering a side wind. If, as is generally the case, the radar antenna is rigidly fixed on the aircraft, the scanning beam will no longer be at right angles to the ground track but will be rotated by an angle equal to the drift angle of the aircraft. This distortion can be corrected by rotating the line scan on the cathode ray tube by an amount proportionate to the drift angle.

The second error, known as ground speed distortion, arises from lack of synchronisation between the motion of the film over the image plane in the recorder and the speed of the aircraft over the ground. If this synchronization is not achieved, the scale factor lengthwise along the film record will not be in agreement with the lateral scale factor and the co-ordinates of the final picture will be inaccurate. Both these errors can be compensated for by using a Doppler navigator to provide drift angle and ground speed information.

In operations in Vietnam, the *Mohawk* OV-1B with side-looking radar, can quickly scan large areas to detect enemy vehicular movement. In the past, this could only be accomplished by taking large numbers of aerial photographs and examining each one of them individually. This process was so time-consuming that it generally eliminated the possibility of quick reaction to attack these fleeting targets. Today, with the SLAR in-flight processor and the data transmission link, a ground observer can examine reconnaissance information obtained by the aircraft while the aircraft is still continuing its mission. The time between the detection of a target and the despatch of an attack force can therefore be reduced to the minimum.

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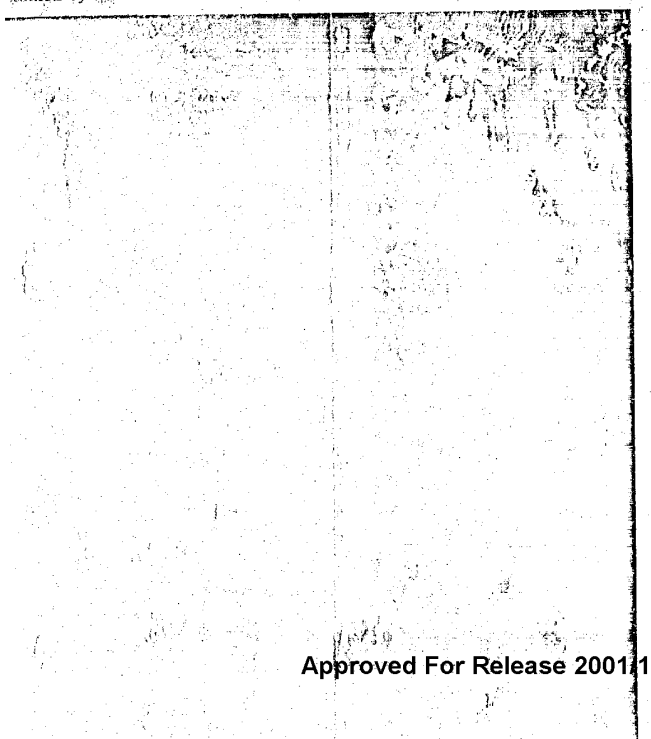
The threefold capability of the *Mohawk* surveillance system: visual, photographic and radar, has aroused interest among armed forces outside the United States. To meet this interest the US Army has created a Army/Industry team to demonstrate the tactical utilization of the *Mohawk* system. Demonstration and evaluation programmes have been conducted for both the West German Army and the French Army, and instruction in the operation of the *Mohawk* and its systems has been given to specialists from the two forces. ✦

hoenix, Arizona as seen by the side-looking radar. The black stripe down the entre of the photograph is the ground directly below the aircraft which is not anned by the two radar beams.



A radar picture of the Los Angeles area. The apparent shadows behind the mountains on opposite sides of the picture result from the central position of the scanning beam. As an aircraft flying at 3,000 ft. can "see" more than 50 miles each side, these pictures give an impression of the large area that can be covered in a single photograph.